

$$6. y' = x \ln x$$

$$y = \int x \ln x \, dx$$

$$y = \int \underbrace{\ln x}_u \cdot \underbrace{x \, dx}_{dv}$$

$$uv - \int v \, du$$

$$y = (\ln x) \left( \frac{1}{2} x^2 \right) - \int \frac{1}{2} x^2 \cdot \frac{1}{x} \, dx$$

$$y = \frac{1}{2} x^2 \ln x - \frac{1}{2} \int x \, dx$$

$$y = \frac{1}{2} x^2 \ln x - \frac{1}{2} \cdot \frac{1}{2} x^2 + C$$

$$y = \frac{1}{2} x^2 \ln x - \frac{1}{4} x^2 + C$$

$u = \ln x$	$dv = x \, dx$
$du = \frac{1}{x} \cdot dx$	$v = \int x \, dx$
	$v = \frac{1}{2} x^2$

$$7. \int (x^4 e^x) \, dx$$

$$= x^4 e^x - 4x^3 e^x + 12x^2 e^x - 24x e^x + 24 e^x + C$$

$$= e^x (x^4 - 4x^3 + 12x^2 - 24x + 24) + C$$

S	D	I	$\int e^x \, dx$
+	$x^4$	$e^x$	
-	$4x^3$	$e^x$	
+	$12x^2$	$e^x$	
-	$24x$	$e^x$	
+	$24$	$e^x$	
-	$0$	$e^x$	